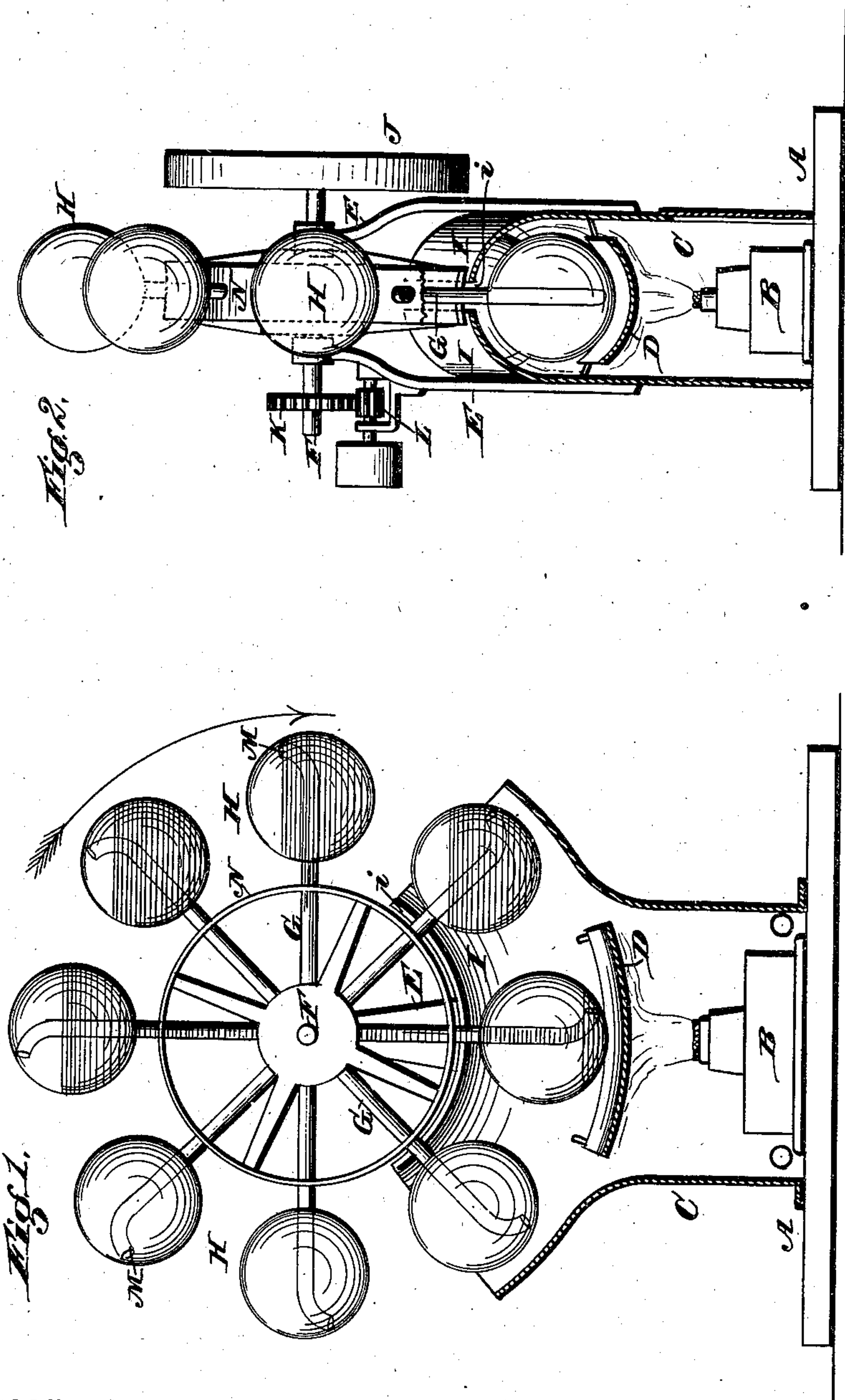


(No Model.)

A. ISKE.
MOTOR.

No. 389,515.

Patented Sept. 11, 1888.



Witnesses,
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UNITED STATES PATENT OFFICE.

ALBERT ISKE, OF LANCASTER, PENNSYLVANIA.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 389,515, dated September 11, 1888.

Application filed April 20, 1888. Serial No. 271,319. (No model.)

To all whom it may concern:

Be it known that I, ALBERT ISKE, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement on Patent No. 243,909, granted to Anthony Iske and Albert Iske on the 5th of July, 1881, in which the tubes were extended nearly through the bulbs, in order that the volatile liquid contained therein may be forced upward through said pipes from bulb to bulb under the pressure of its vaporized particles without the escape of the vapor itself.

My improvement consists in the combination of such tubes thus arranged, but bent at their ends within said bulbs, and the necessary heating, supporting, and power-transmitting devices, the bending of the tube ends serving to prevent the liquid from running back down the tubes.

In the accompanying drawings, Figure 1 represents a front elevation, the end of the casing being broken away, of a motor embodying my invention; and Fig. 2 represents a similar view taken at right angles to Fig. 1.

A designates the base of the motor; B, a lamp thereon; C, a casing inclosing said lamp and extending above it; D, a curved deflector-plate above said lamp; E, two standards raised from the sides of said casing; F, a shaft having its bearings in the tops of said standard; G, a series of tubes arranged like the spokes of a wheel, but attached at their middles to said shaft; and H, the bulbs arranged on the ends of said tubes.

The sides of casing A are arched over to form an upper deflecting-plate, I, which is provided with a slot, *i*, to allow the passage of the tubes G while said tubes and bulbs are turning with the shaft. For the same purpose with regard to said bulbs the ends of the space between the deflector-plates D and I are left open. The bulbs in passing through said space are heated by the lamp B and the hot air therefrom, which circulates between said plates. The said bulbs

having been previously supplied with volatile liquid nearly sufficient to fill one bulb in each pair, and the ends of the tubes extending through the centers of the bulbs and nearly across the hollow interiors thereof, the expansion of a part of the liquid in each bulb successively as it comes under the influence of the heat, as aforesaid, will force the remainder of said liquid up through the tube to the other bulb of the pair, and the weight of the liquid in the latter bulb will then cause it to descend, turning the shaft. Each pair of bulbs acting in rapid succession will cause the rotation also to become rapid. The shaft F carries a fly-wheel, J, and a gear-wheel, K, the latter meshing with a pinion, L, for transmitting motion. An annular shield, N, attached to the tubes G, prevents the heat from affecting the upper bulbs.

Heretofore I have in some instances, as shown in my patent, No. 242,454, bent the ends of the tubes in the direction of rotation at and near the points where they are attached to the bulbs, the said tubes not entering the bulbs. The defect of this construction is that the bent end of the tube attached to each bulb is during the lower part of its travel at first above the entire mass of liquid in said bulb and afterward above the greater portion of said liquid, until the gradual elevation of said bulb, as rotation proceeds, places the bent part of the tube at the bottom. Until this last position is taken only a part of the liquid at most can be forced up through the tube by the expansion of the vapor, and at first not even that, as the vapor will be free to escape through the tube to the upper bulb without forcing the liquid up before it. In consequence the supply of liquid to the upper bulb will be lessened and its weight will in part be offset by the liquid which remains temporarily, as stated, in the lower bulb. As the entire power of this motor is derived from the excess of the weight of the upper bulbs, supplied with liquid, over the lower bulbs, deprived thereof, these considerations are of great importance. I have also sometimes employed, as shown in my patent, No. 243,909, a series of straight tubes extending nearly through the bulbs, so that their ends would be below the mass of the liquid in the latter during the lower part of the revolu-

tion of said bulbs. In this way the defects incident to the construction above referred to are avoided; but if the liquid in each pair of bulbs and tube is sufficient to three-fourths fill one of the bulbs it will of necessity cover the upper end of the tube during the latter part of the first fourth of its rotation, starting from the highest point which said bulb attains in its rotation. While the end of the tube is thus immersed, a part of the liquid will run back into the lower bulb unless held by the centrifugal force due to rapid motion; but such centrifugal force is hardly appreciable when the bulbs are revolving slowly, as in starting the motor, or when its speed is temporarily slackened for any purpose, and even when the rotation is rapid the centrifugal force of a motor of small diameter cannot be relied on to hold any considerable weight of liquid in place in the upper bulbs. Whatever liquid runs down to the lower bulbs of course acts doubly against the efficiency of the machine—first, by lessening the gravity of the operative side thereof, and, secondly, by increasing the counter-balance on the other side. These disadvantages will not occur if only a small amount of liquid is used, as it will not then cover the upper end of the tube, nor run down through the same; but the motor will be correspondingly weak. It is important to use the greatest practicable amount of liquid, and at the same time to insure getting the full benefit of the weight thereof in rotating the motor and its shaft. This purpose is effected by the bent ends of the tubes, which are extended in my

present improvement nearly through the bulbs, as in Patent No. 243,909, and then turned backward in the direction opposed to that of rotation. Sufficient liquid may be used to more than three-fourths fill the bulb, and the upper end of the tube will nevertheless be always above the surface thereof until the tube is horizontal, and the lower end will be immersed in the liquid so long as there is any liquid in the bulb.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A motor provided with bulbs for holding vaporizable liquid and tubes connecting said bulbs, as stated, the tubes being extended nearly through the bulbs and bent within them in a direction opposed to that of rotation, for the purpose set forth.

2. In a motor, the combination of a series of bulbs, their connecting-tubes, the shaft on which they are mounted, and a calorific device below them, with a plate or shield which protects the bottoms of the bulbs from the direct heat of the flames and causes the same to pass around and over the bulbs, this shield or plate being slotted to allow the passage of the tubes as they turn with the shaft, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT ISKE.

Witnesses:

P. DONNELLY,
JAS. B. DONNELLY.